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FAILURE ANALYSIS OF ADHESIVE TEE JOINTS

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ABSTRACT: The present study is concerned with the failure analysis of adhesive tee joints. Shape factors that allow correlating the static strength of two joints with different geometries are proposed. The formulas are valid for adhesives with brittle-elastic behaviour and highly resistant adherends. Therefore, only a few tests performed in particular joint taken as reference are necessary for assessing the structural integrity of any similar joint with arbitrary geometry. Results from experiments performed in ASTM 1020 steel tee joints with different bonding areas are compared with model prediction showing a good agreement. Prior to bonding, surfaces were submitted not only to mechanical but also to chemical treatment. Mechanical treatment consisted on surface grit blasting, producing an average Rt=100μm (Total Roughness - ISO 4288:1996) surface roughness profile. Chemical treatment consisted on surface spraying silanisation. The adhesive was ARC 858 (Macseal) at 4/1 resin/hardener proportion. Cure process was induced under 400C for 24h prior to testing.

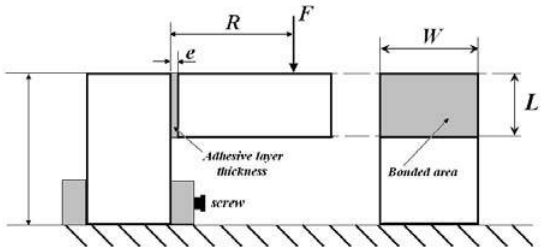


Figure: Basic joint geometry.

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